

## An extremely favourable outcome in a case of severe myositis ossificans of elbow

Hitendra Wamborikar<sup>1</sup>, Prateek Upadhyay<sup>2</sup>, Naresh Dhaniwala<sup>3</sup>, Arzoo Chadha<sup>4</sup>, Ankit Jaiswal<sup>2</sup>

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### Author Affiliation:

<sup>1</sup>Assistant Professor, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

<sup>2</sup>Post Graduate Resident, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

<sup>3</sup>Professor, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

<sup>4</sup>Post Graduate Resident, Department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

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### ABSTRACT

**Introduction:** Myositis ossificans (MO) is a self-limiting, reparative disease characterised by growing fibroblasts in soft tissues that develop bone and cartilage. Fractures of the distal humerus, on the other hand, account for around 2% of all fractures. Most cases progress to malunion if left unaddressed, but myositis ossificans is a large concern that contributes to increased deformity and compromised limb functioning. Delay in obtaining treatment is rather problematic because of the passage of major nerves and vessels around the distal humerus and delayed operative management has no positive effects on regaining the normalcy in the limb function. Surgical intervention requires open reduction and internal fixation with plate osteosynthesis, ulnar and median nerve preservation and rigorous post operative rehabilitation. **Case:** A 21 years old male came with 2 months old history of pain, restricted mobility in right elbow. Xray and CT scan of right elbow showed Bi-columnar low T fracture of the right distal humerus. Patient was managed with open reduction and internal fixation with bi-columnar plating, meticulous dissection of the myositis ossificans and ulnar nerve release.

**Keywords:** Distal Humerus fracture, Myositis ossificans, ulnar nerve entrapment.

### 1. INTRODUCTION

Myositis ossificans (MO) is a self-limiting, reparative disease that is characterized in soft tissues by growing fibroblasts that develop bone and cartilage (Unni, 2005). 3 subtypes of myositis ossificans are found: hereditary cause myositis ossificans progressive; nontraumatic or without any injuries, pseudo malignant myositis ossificans progresses. Myositis caused by direct and immediate trauma is called Myositis ossificans circumscripta (Gindele et al., 2000). Distal humerus fractures account for about 2% of all fractures. High-energy injuries affect the amount of distal humerus fractures in youths. The most frequent types of fatalities are automobile collisions, athletics, falling from great heights, and automotive accidents. Brown and Morgan (1971) published their findings on nonoperative treatment of intra-articular distal humerus fractures in ten patients. Distal humerus fractures are



generally complex injuries with associated fragmentation, bony instability and soft tissue injury. But the risk of functional impairment is relatively high when these injuries are managed nonoperatively. Less commonly there is also incidence of Myositis ossificans which can lead to nerve entrapment and restriction of movement at the joint. These complications are highly detrimental and affect the vocational aspect as well as daily activity of the patient severely. There is little to no effect of physiotherapy in cases where myositis ossificans has occurred and ultimately the patient requires operative treatment, which has low chances of recovery tonormal functionality.

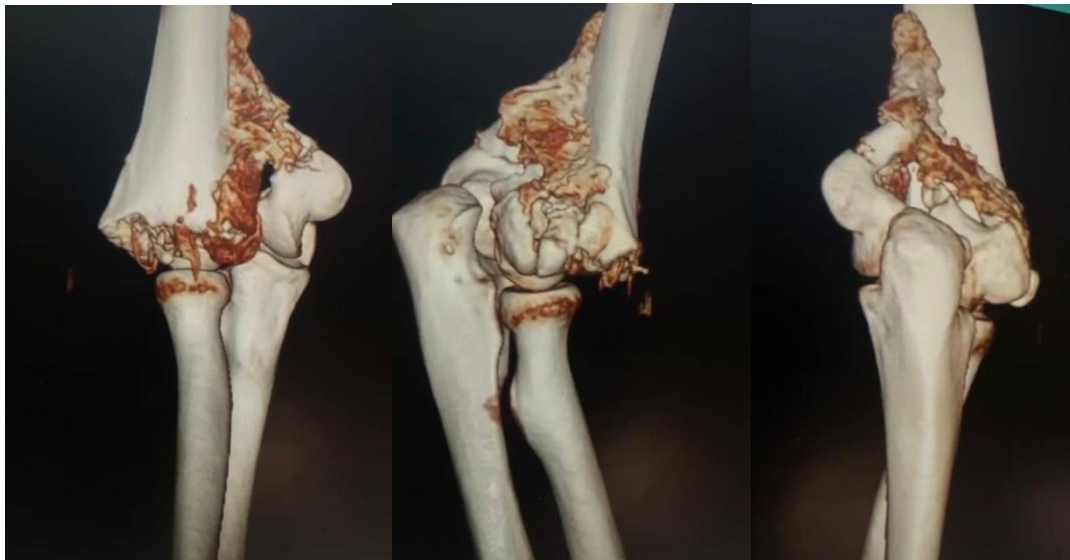
## 2. CASE REPORT

A 21 yr old male came with complaints of pain, swelling & inability to move the right elbow since 2 months. Patient gives history of Road Traffic Accident 2 months back following with he developed the pain, swelling and restricted mobility at the right elbow. Following the accident the patient went to an indigenous healer and applied certain ointments. No immobilisation was done. Now the pain and swelling has reduced significantly but the patient is unable to do any active movement at the elbow joint. There were no other associated injuries. On examination mild swelling present in the cubital fossa, tenderness on the medial epicondyle of humerus present. Irregular medial and lateral supracondylar ridge felt, trochlea and capitulum radial head could not be palpated. Active flexion at elbow joint was zero degrees; passive flexion was 0 to 20 degrees. Power in the right sided fingers was grade III, sensory hypoesthesia present in the ulnar nerve distribution region. Shoulder joint normal. Radial and Ulnar artery pulsations are normal. X-ray AP and Lateral views of the elbow right side done which showed maluniting Inter-condylar right humerus fracture (Figure 1).

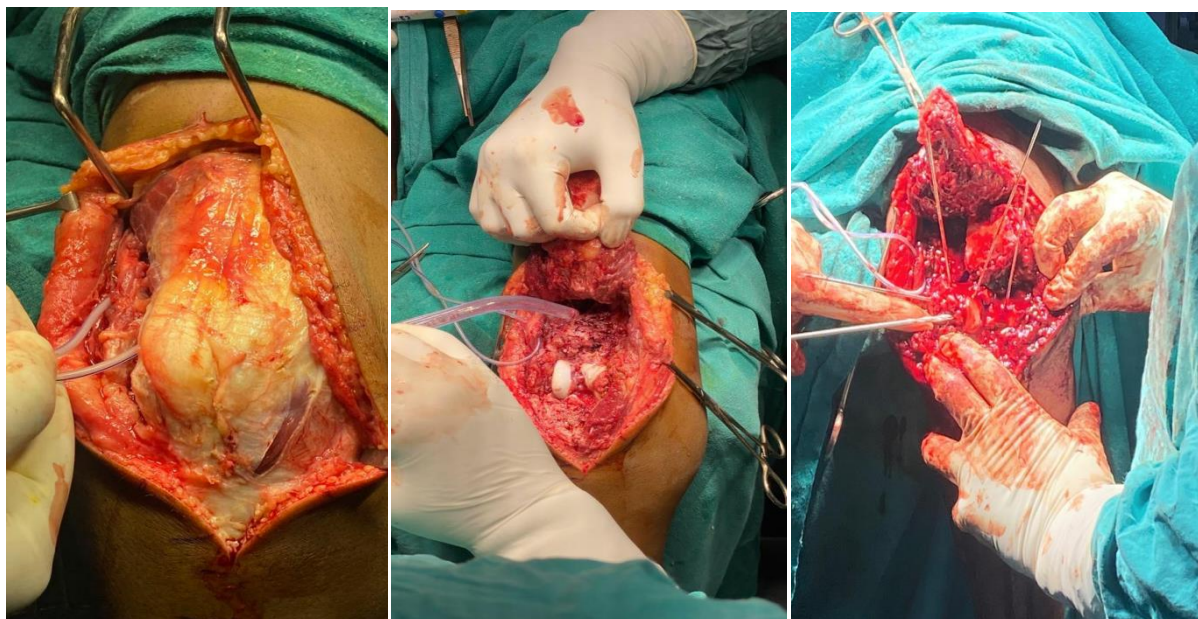


**Figure 1** Plain radiograph of right elbow Anteroposterior and lateral view showing malunited low T fracture of the distal humerus with extensive myositis ossificans

CT right elbow confirmed the diagnosis (Bi-columnar low T fracture of the right distal humerus) with myositis ossificans (Figure 2). Intraoperatively using Paratricipital approach, dissection was done (Figure 3A). Extensive Myositis ossificans along with entrapment of ulnar nerve was observed (Figure 3B). Radio-humeral joint was intact. The callus was resected out and ulnar nerve freed which led to full flexion passively. Reduction was achieved and fixation done with bi-columnar plating (Figure 3C). Ulnar was Trans positioned anteriorly.



**Figure 2** Show the 3D reconstruction CT scan of the right elbow



**Figure 3** A, B, C. Intraoperative images of the procedure (posterior approach).

Post-operative X-rays showed satisfactory reduction and fixation (Figure 4). Patient's elbow was mobilised the following day. On post-operative day 1 grade I power was observed in the elbow and the fingers which progressively increased to Grade IV power by POD 4, Sensory hypoesthesia reduced in the ulnar nerve distribution. Elbow range of motion reached 0 to 90 degrees by POD 4.



**Figure 4** Post-op Plain radiograph of the right elbow showing fixation with bicondylar plating and tension band wiring of the olecranon.

### 3. DISCUSSION

The phrase heterotopic ossification is interchangeable with myositis ossificans (MO). Myositis ossificans is a misnomer since then it doesn't necessarily require inflammation or occur within muscle, and the early proliferative process is devoid of bone (Unni, 2005). Neoplastic fibrous histiocytoma, leiomyosarcoma, and synovial sarcoma, as well as early-stage malignant soft tissue tumours, soft tissue malignant tumours with calcification or ossification, are all terminology used to describe myositis ossificans (Li et al., 2016). Myositis ossificans has three subtypes: inherited myositis ossificans, non-traumatic or pseudo-malignant myositis ossificans, which occurs without any trauma, and myositis ossificans circumscripta, which is caused by immediate and direct trauma. MO circumscripta or traumatica is the most common type (Gindele et al., 2000). The majority of MO cases occur in the arms and legs big muscle groups (Weiss et al., 2008). Intraarticularly, they are uncommon. Although the pathophysiology of MO development is not known, it is known to occur after tissue injury when fibroblasts differentiate into abnormal osteogenic cells (Walczak et al., 2015; Garland, 1991; Mavrogenis et al., 2011). When the inflammatory cascade is triggered by damage, cytokines (bone morphogenetic proteins 2, 4 and TGFs) are released, resulting in the transformation of skeletal muscle containing endothelial cells to mesenchymal stem cells and bone development of extra skeletal tissue, according to Medici and Olsen (2012); (Li et al., 2016; Weiss et al., 2008; Walczak et al., 2015; Garland, 1991; Mavrogenis et al., 2011).

Bi-column or intra-articular fractures are the 2<sup>nd</sup> most common distal humerus fracture, amounting for 37% of all (Robinson et al., 2003). The distal humerus fracture's overall incidence is rising, just like the incidence in hip, proximal humerus, and wrist fractures. When traditional clinical and radiographic results point to myositis ossificans, which is normal in adults but rare into a joint, it should be considered in ruling out of diagnosis of an intra-articular mass (Leung et al., 2010). On a CT scan, a central radiolucency surrounded by a thick periphery can be seen in myositis ossificans. On simple films, the first symptom of myositis ossificans is soft tissue swelling, which is used to make an initial diagnosis. Abnormal images can occur two - three weeks that of the injury, as they typically appear after four - five weeks. Higher health-care costs and demographic impairment are expected to result from an ageing population with longer life expectancies, along with the fact that the bulk of these fractures require surgical attention. Complications such as myositis ossificans in younger age groups would raise the burden, not just on the health-care system's efficiency, but also on the economy. Jones and Ward (1980), the sciatic nerve was confirmed to be squeezed by MO in the biceps femoris muscle.

Radiography, needle EMG, and exploration by surgery are needed to reach to the diagnosis. Fitzsimmons et al., (1993) published a report of radial nerve damage caused by MO in the mid-humerus posteriorly, which was confirmed by radiography, a bone scan, and needle EMG. Poptodorov et al., (2009) documented sciatic neuropathy caused by MO present between the semitendinosus muscle and biceps femoris muscles. In these two cases, MRI and CT scans were used to investigate MO and related nerve compression, which were later proved by invasive surgical experimentation. Guan et al., (2016) documented a case of sciatic



nerve damage caused by compression caused by MO in the gluteus muscle, which was diagnosed on MRI and CT scans. Myositis ossificans may be treated surgically or conservatively. Some physicians called for surgical care, but the best time to have the surgery is still up for discussion. According to Conner et al., (2009) surgical operation should be begun only after the disease has finally stopped. However, Russo et al., (2010) described a report of non-traumatic MO in the left scapula with severe pain and no signs of calcification on radiography. Her symptoms were immediately relieved after an early surgical excision. Since the functional outcome of a long-standing inter-condylar humeral fracture with myositis ossificans has been weak in the past, this case report is a fantastic example of how, with diligent dissection, manipulation, nerve release, and fixation, the limb can be restored to its former glory.

In my study, the patient was operated on 2 month after the trauma, on admission, the patient had active elbow flexion of 0 degrees and passive elbow flexion of 0-20 degrees but after surgery, not only did the patient's elbow flexion was restored to 110 degrees but also he regained his sensory and motor functions.

#### 4. CONCLUSION

The surgical resection in our case was performed 2 month after the onset of symptoms. Post-operatively, excellent results were obtained. Post operatively patient regained elbow flexion to 0-110 degree with grade V power. Also the sensations along the ulnar nerve distributions were regained on post-op day 3. Usually such results are not seen with myositis ossificans but due to careful dissection, stable fixation, acceptable anatomical reduction and aggressive physiotherapy excellent outcome was achieved.

#### Author's Contribution

All authors contributed equally to the manuscript.

#### Acknowledgement

We thank the patient who participated and contributed sample to the study.

#### Informed Consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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#### Conflict of Interest

The authors declare that there are no conflicts of interests.

#### Data and materials availability

All data associated with this study are presented in the paper.

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